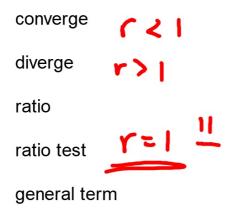
Precalc 12.4

Determine whether a series is convergent or divergent
Use the comparison test



¥reference series

comparison test (n>1)

Total distance the ball bounces

video: fibanocci sequences http://mathandmultimedia.com/2011/04/09/nature-by-numbers-video-by-cristobal-vila/ Ratio Test

Let a_n and a_{n+1} represent two consecutive terms of a series of positive terms. Suppose $\lim_{n\to\infty}\frac{a_{n+1}}{a_n}$ exists and that $r=\lim_{n\to\infty}\frac{a_{n+1}}{a_n}$. The series is convergent if r<1 and divergent if r>1. If r=1, the test provides no information.

r<1 Convergentr>1 Divergent

What if the ratio test is inconclusive? (r=1)

p. 789, also handout

Summary Series (No. 1) Divergent:
$$a_1 + a_1r + a_1r^2 + \cdots + a_1r^{n-1} + \cdots, |r| < 1$$
Summary Series (No. 1) Divergent: $a_1 + a_1r + a_1r^2 + \cdots + a_1r^{n-1} + \cdots, |r| > 1$
Series (No. 1) Divergent: $a_1 + (a_1 + d) + (a_1 + 2d) + (a_1 + 3d) + \cdots$
Reference (No. 1) Divergent: $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \cdots + \frac{1}{n} + \cdots$ This series is known as the harmonic series.

D-Series. Convergent: $1 + \frac{1}{2^p} + \frac{1}{3^p} + \cdots + \frac{1}{n^p} + \cdots, p > 1$

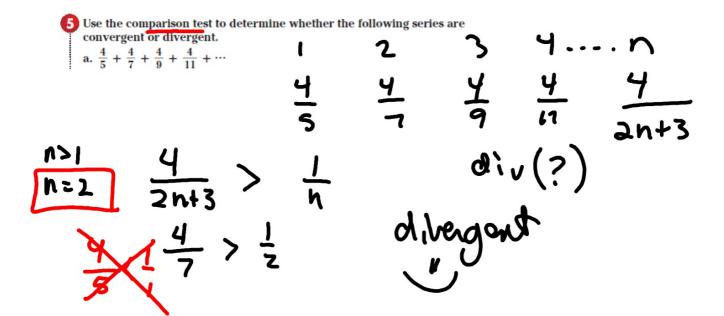
Find general term

Compare to series that it most resembles

n>1 if conv, yours has to be less

If div, yours has to be more

Go straight to comparison test (probably bec. r=1...)



$$\frac{1}{1} = \frac{2}{3} = \frac{4}{1}$$

$$\frac{1}{(2n-1)^2}$$

$$\frac{1}{(2n-1)^2}$$

$$\frac{1}{(2n-1)^2} < \frac{1}{N^2}$$

$$\frac{1}{(2n-1)^2} < \frac{1}{\sqrt{2^2}}$$

$$\frac{1}{\sqrt{2^2}} < \frac{1}{\sqrt{2^2}}$$